



EPCIS - Introduction

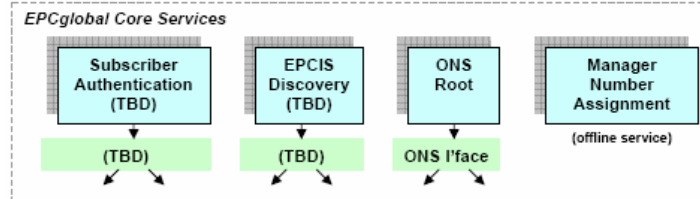
Presented at Paris JAG Meeting in 2007



- EPC Information Services (EPCIS) is a new breakthrough for trading partners to share information.
 - Creates a new dimension in collaboration
- A standard-based approach to securely share product movement information that will provide visibility and improve businesses processes in an unprecedented manner.
 - Foundation for increasing visibility, accuracy, and automation throughout the supply chain
 - Driven by end user needs to share event related information

Evolution of the EPCglobal Network standards

200? – Discovery Services & Subscriber Authentication



2006-07 – Electronic Product Code Information Service (EPCIS)

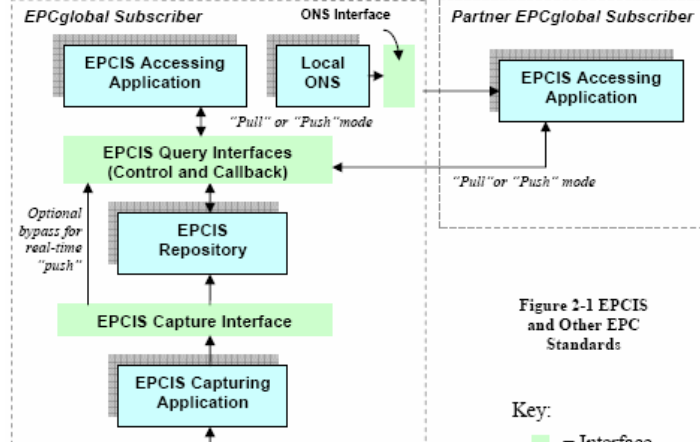
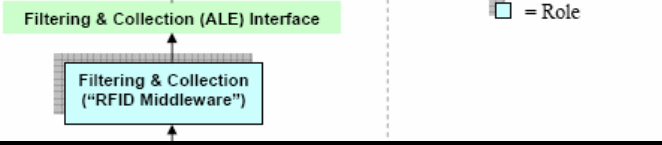
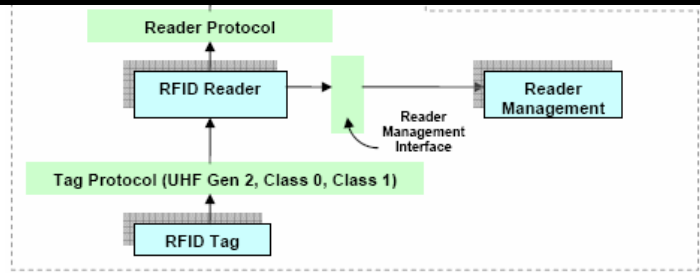


Figure 2-1 EPCIS and Other EPC Standards

2005-06 – Filtering & Collection (ALE)



2005-06 - Tags & Readers





EPCIS - Overview

Originally presented by Craig Asher, IBM at GS1 Global Forum in
Feb 2007 with recent updates



What is EPCIS?

- EPCIS = EPC Information Services
- A ratified EPCglobal standard
 - Data model for product movement events in the life of uniquely identified objects
 - Interfaces for capture and query of events
- Industry and Application Neutral
 - Cross-industry framework
 - Cross-industry and industry-specific vocabularies and extensions
 - User-extensible
 - Allows each trading partner to keep their data
- Secure information exchange
 - Everyone controls their data and shares it only with those they choose to share it with
 - Leverages established security mechanisms
- A supplement to, not a replacement for, existing enterprise information systems
 - Complementary to EDI

Ratified Specification!

- The 1.0 Specification was ratified in April 2007 - www.epcglobalinc.org/standards/EPCglobal_EPCIS_Ratified_Standard_12April_2007_V1.0.pdf
- 20+ global technology and end user companies active in EPCIS Software Action Group
- Conducted successful Interoperability Event with 12 global participants in July 2006
- Conformance Testing to begin in July 2007

EPCIS Software Action Group Leadership Team

- Co-Chairs - Craig Asher, IBM and Richard Swan, T3Ci
- Specification Editor – Ken Traub, BEA
- Facilitator – Gena Morgan

Wide deployment across industries

- Retail Supply Chain (RSC) for Promotional Visibility and Electronic Proof of Delivery – Phase I and Phase II pilots underway or completed
- Healthcare Life Sciences (HLS) for Product Authentication/Pedigree
- Transport and Logistics (TLS) is using within global pilot
- Activity expected soon in Consumer Electronics, Media and Entertainment, & Aerospace + Defense

- Product Identification that can be captured may come in the form of:
 - Passive RFID Tag – UHF Gen 2, HF
 - Barcodes – Linear, Data Matrix
 - Active RFID Tag
 - Human Readable Number
 - And more in the future!

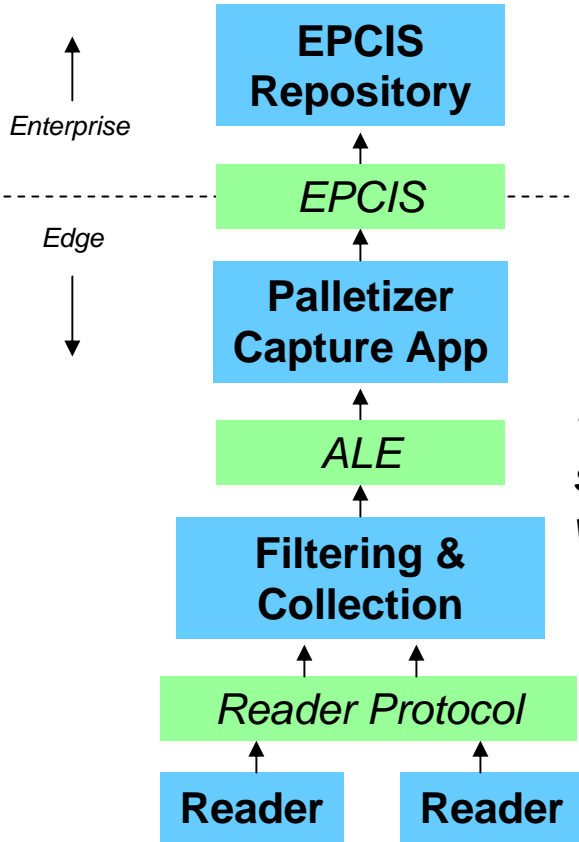
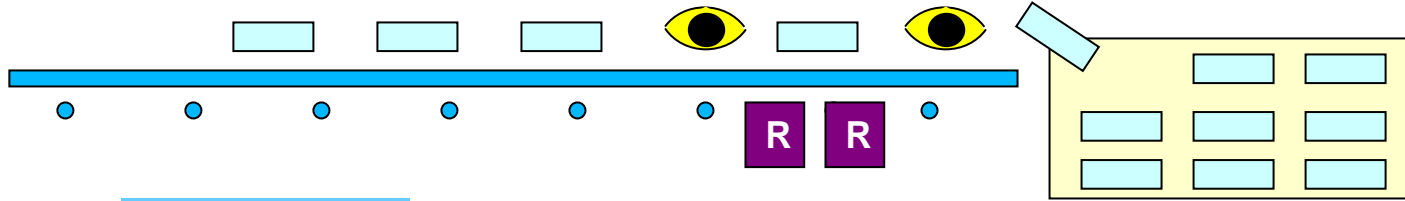
What is EPCIS Data?

EPC Events answer 4 questions – **What, Where, When, and Why**

<p>What</p>	<ul style="list-style-type: none"> • EPC number (can leverage master data - GTIN) • Manufacturing Data (lot, batch, expiration date) • Transactional Data (PO, Shipment, Invoice)
<p>Where</p>	<ul style="list-style-type: none"> • Location (can be fixed or moving – leverage master data - GLN)
<p>When</p>	<ul style="list-style-type: none"> • Event Time • Record Time
<p>Why</p>	<ul style="list-style-type: none"> • Business Process Step – e.g.: Receiving, Shipping • Product State – e.g.: Saleable, Active, In Transit • Current Conditions – e.g.: Temperature

The EPCIS standard enables extending event data in each direction

Data Capture Example – Palletizer



“the association of the following case tags to the following pallet tag was created at palletizer #3, to fulfill order #1234 at a specific time”

What, Where, When, Why

“between the time the case crossed the first beam and the second beam at a particular location, the following tag was read”

What, Where, When

dozens of individual tag read events from specific antenna

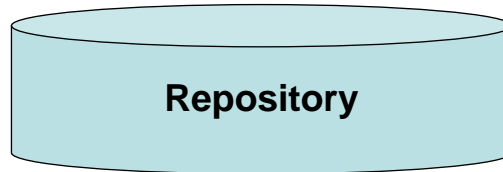
What are the EPCIS Events?

- EPCIS standard defines 4 standard XML events
- Events are accepted by the Capture interface and returned by the Query interface
- Events originate from RFID sensor reads and enterprise systems
- Can readily extend attributes for every event

Event Type	Object Event
Event Fields	Timestamps
	Action
	EPCList
	bizStep
	bizLocation
	readPoint
	Disposition
	bizTransaction

Event Type	Quantity Event
Event Fields	Timestamps
	EPCClass
	Quantity
	bizStep
	bizLocation
	readPoint
	Disposition
	bizTransaction

EPCIS Query Interface 



EPCIS Capture Interface 

Event Type	Aggregation Event
Event Fields	Timestamps
	Action
	ParentID
	ChildEPCList
	bizStep
	bizLocation
	readPoint
	Disposition
	bizTransaction

Event Type	Transaction Event
Event Fields	Timestamps
	Action
	ParentID
	EPCList
	bizStep
	bizLocation
	readPoint
	Disposition
	bizTransaction

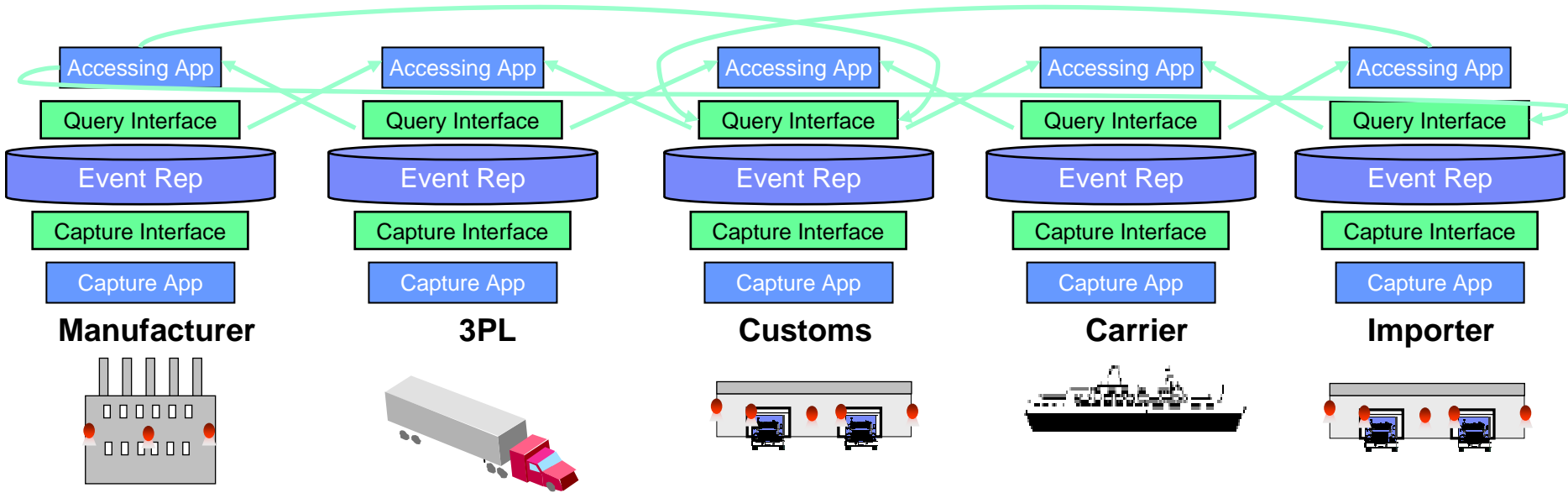
- EPC Event Data consists of the following which is the basis for standardized Data Exchange
 - EPC
 - Time
 - Read Points
 - Business Locations
 - Business Steps
 - Disposition
 - Business Transaction Type

Business Steps
accepting
receiving
holding
inspecting
storing
stocking
repackaging
packing
picking
loading
shipping
staging_outbound
reserving
encoding
commissioning
decommissioning
destroying
dispensing
other

Dispositions
active
inactive
reserved
encoded
in_transit
sellable_not_accessible
sellable_accessible
non_sellable
non_sellable_expired
non_sellable_recalled
non_sellable_damaged
non_sellable_no_pedigree_match
returned
in_progress
sold
destroyed
unknown

How does EPCIS Data Sharing work?

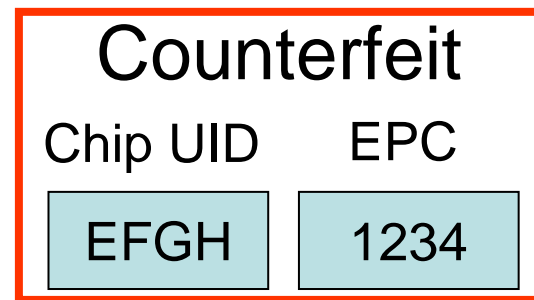
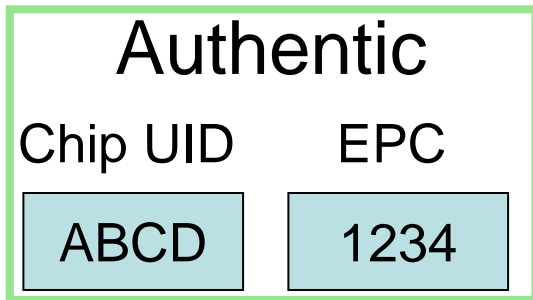
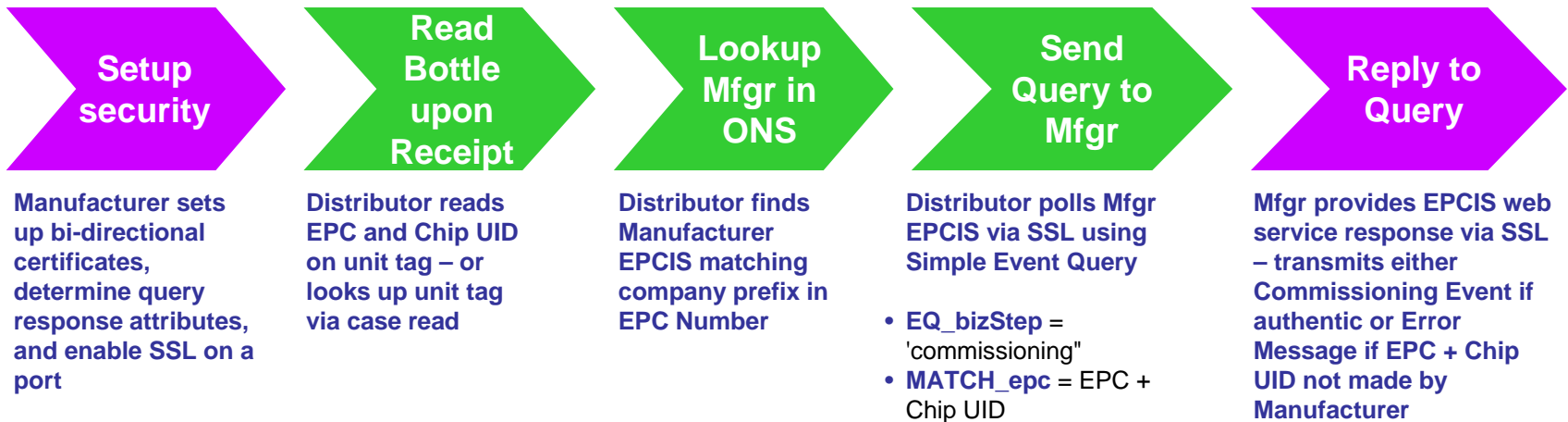
EPCIS instances at each enterprise communicate via the EPCIS Query Interface



- Today, trading partners know each other through pre-arrangement
- Future: “discovery” services to find partners

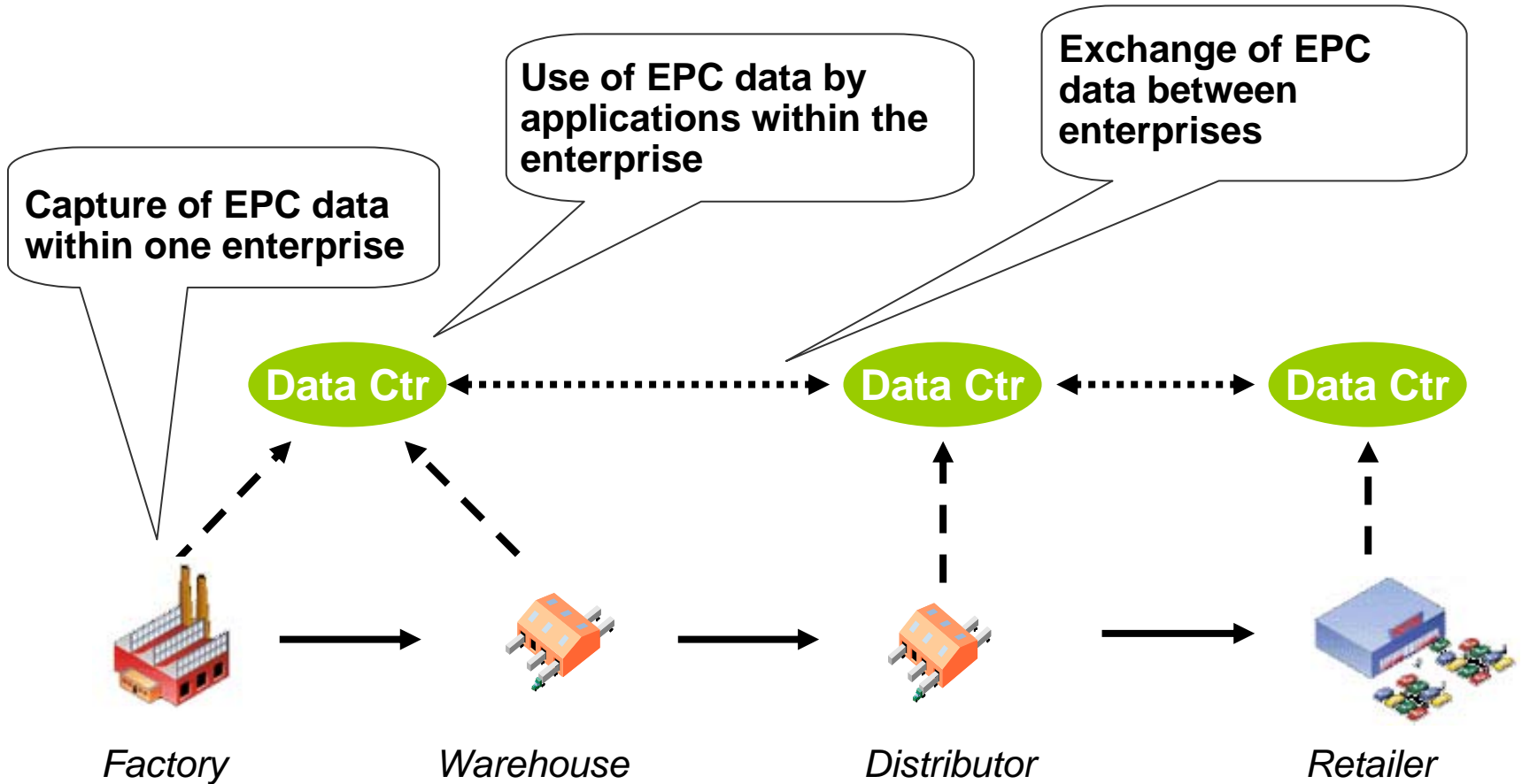
Query Example – Product Authentication

Distributor (or Retailer) asks Manufacturer:
Is this bottle authentic?

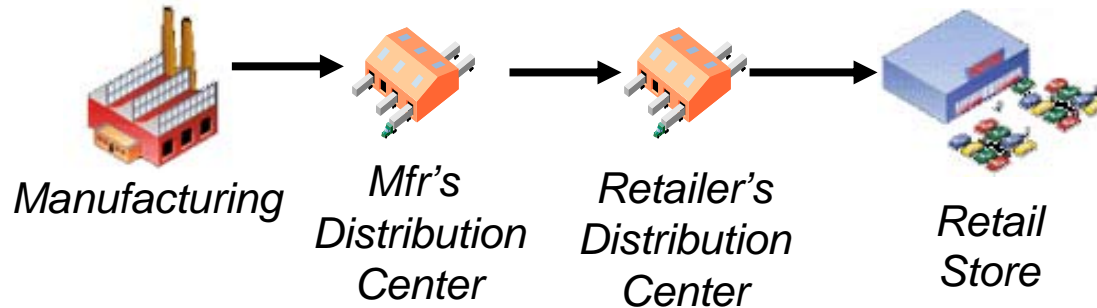
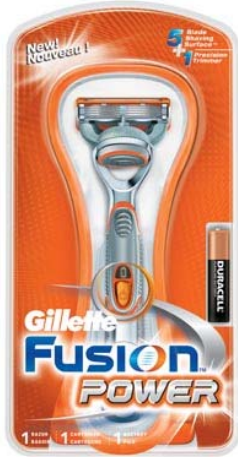


NOTE: Minimal configuration needed for any additional supply chain partners – only need to setup a certificate.

EPC Data Within and Across Enterprises



EPCIS in Action: Retail Promotions



- Give unique EPC to each case of promotion-packaged item, on RFID tag
- Equipment facilities with RFID readers: loading dock doors, trucks, retail back-room door, dumpster
- Can now measure & drive promotion:
 - Timeliness: is promotional packaging reaching consumer in time?
 - Effectiveness: is promotional item selling better?

- Work in Process Inventory Tracking
- Electronic Proof of Delivery
- Chain of Custody Traceability/ePedigree
- Product Authentication
- Returns Management
- Operations Management
- Diversion/Theft Detection
- And more ...

EPCIS supports this variety of use cases because it enables flexible & secure cross-trading partner data sharing

Why is EPCIS valuable?

- Provides **standard** data model, capture, and query interfaces to enable track and trace, product authentication, diversion detection, and other use cases across supply chain partners across multiple industries
- Security is a core concept – **Each trading partner keeps their data** – partners only move / share data they wish to share on an on-demand basis
- **No vendor lock in** - 20+ companies active in EPCIS SAG – conducted interoperability with 12 companies - large & small & international – and trading partners can chose to build their own
- **Already in use today** in Retail Supply Chain (RSC), Healthcare Life Sciences (HLS) and Transport and Logistics (TLS)
- ***More significant of a breakthrough than UHF G2***



TOP 10 EPCIS Frequently Asked Questions



Q: Why should my company use EPCIS standards?

A: If your business involves handling physical goods – for example, if your organization is a manufacturer, distributor, logistics provider, reseller or large end user of tangible goods – then you probably already consume information internally or exchange information externally about the location and status of material. The EPCIS standard provides a path for cost-effectively sharing information with a much finer granularity of detail.

Q: Why should I use the EPCIS standard if I do not wish to share data with other trading partners?

A: EPCIS is the bridge between the physical world and information systems. Many businesses have completely internal business processes that involve the handling of goods, and EPCIS provides a standard way of managing visibility into those processes. The benefits of giving business applications visibility into the physical world are as compelling within the four walls as they are between trading partners.

Q: Does the EPCIS standard replace EDI standards?

A: No. The EPCIS standard provides a way to share high volume, very fine grain information about material movement and status among cooperating partners. EPCIS does not address purchasing, forecasts, bidding, billing, etc. that are typically exchanged via EDI in a business transaction between two parties.

Q. Is EPCIS a large scale enterprise application designed by a committee?

A: EPCIS is not an application. EPCIS is a *standard* that defines interfaces for representation and exchange of data. The EPCIS interface standards support applications, by specifying a data and communication format. The EPCIS standard provides what is necessary to share data, but does not provide application level functionality.

Q: Does EPCIS have a sufficient level of functionality for an enterprise application?

A: EPCIS is not an application. The EPCIS *standard* is a set of interfaces that support sharing of visibility data. This is similar to email protocols supporting the distribution of Internet mail. EPCIS defines a capture interface and a query interface to obtain and share business event information. The standard may be implemented by applications, but the applications themselves are developed by end users and solution providers – not EPCglobal. Those applications are expected to be quite diverse in their actual implementation.

Q. Is EPCIS the same thing as ONS?

A. No. Object Naming Service (ONS) can be thought of as a lookup service that takes an EPC as input, and produces as output the address (in the form of a Uniform Resource Locator, or URL) of an EPCIS repository designated and implemented by the EPC Manager of the EPC in question. EPCIS, on the other hand, provides the means to communicate further information about an individual EPC.

Q. Is ONS required to deploy EPCIS?

A: EPCIS can be deployed today without need for ONS or other discovery mechanism. ONS or other discovery mechanisms become necessary when you do not know where to go to get information about a particular EPC.

Q: Is there a master, centralized EPCIS?

A: There is no central implementation of EPCIS. EPCIS is not an application. No single organization or small set of organizations holds the data generated everywhere. EPC information is collected and owned by the organization collecting the data, by whatever manner they choose

Q. How is EPCIS data secured?

A: There are two forms of data security described in the EPCIS specification – authentication and authorization.

- **Authentication** – the EPCIS standard enables the use of multiple message transport bindings that include authentication – including SOAP over HTTP with TLS (web services) and XML over AS2. The implementation of the bindings are defined outside the EPCIS standard.

- **Authorization** – an implementation of the EPCIS Query Interface may use the authenticated identity of the requester, together with arbitrary business rules, to decide which events to deliver to the requestor and which information to include within those events. The EPCIS specification itself does not specify what those business rules are – it is up to each implementation to use authorization rules that are appropriate given its own business situation.